

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE

GAS TRAP, ITEM 141 2/2 ----- SV784943-5 (1) OR SV805257-2 ----- (1)		141FM01 Internal leakage, gas breakthrough. Failure, defective attachment of the hydrophilic screen to the housing cartridge, seal bypass leakage.	END ITEM: Air bubbles and/or contaminants in the coolant loop will bypass the water separator delivery orifices and be entrained into the pump. GFE INTERFACE: Possible loss of pump prime or contaminant ingestion into pump causing pump binding. Results in a loss of coolant flow to the LCVG and to the sublimator. MISSION: Terminate EVA. Loss of LCVG cooling during use. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A	A. Design - P/Ns SV784943 and SV805257: The gas trap cartridge is of welded stainless steel construction. The cartridge is inspected for unfused wires and weld splatter. Bonding repair of 5% max of the effective screen area is allowed. Cartridge seal is of elastomeric material. Surface finish, seal configuration, dimensional tolerances and rigidity of construction provide seal squeeze under all loading conditions. B. Test - Component Acceptance: P/Ns SV784943 and SV805057: A bubble point performance test is performed by submerging the wetted item 0.35 - 0.65 inches below the surface of alcohol and measuring the inlet pressure at which point initial bubbling and 100% bubbling occurs. Initial bubbling shall occur at 8.5" water minimum. 100% bubbling shall occur at 12.0" water max. The item is performance tested by supplying the inlet with a mixture of water and nitrogen at the rates of 195-205 lbs/hr water and 502-695 scc/min nitrogen at an inlet pressure of 10.8-10.9 psid. The item must completely separate the gas from the water: i.e. gas flow out must be within 10% of 502-695 scc/min nitrogen and there must be no entrained gas in the water outlet. The item is additionally performance tested as per above except the water/nitrogen mixture is 195-205 lbs/hr H2O and 502-695 scc/min with Nitrogen at a pressure of 5.8-5.9 psid. Gas flow out must be within 10% of 502-695 scc/min Nitrogen and there must be no entrained gas in the water outlet. PDA: P/Ns SV784943 and SV805257: None. Certification: Certified for a useful life of 112 hours (ref. EMUM-583). P/N SV805257 Certified for a useful life of 188 hours (ref. EMUM-680). C. Inspection - P/Ns SV784943 and SV805257: The screen is gas-tungsten-arc welded to the housing per HS191 Class IIB. The weld is 100% visually inspected at 40X minimum magnification. O-ring interfacing surfaces are 100% inspected per drawing dimensions and surface finish. The O-seals 100% are inspected for dimensional requirements and surface defects. D. Failure History - (Old Design: P/N SV784943) H-EMU-141-D006 (4/15/88). Initial bubbling did not originate from the screen and 100% bubbling did not occur at maximum allowable pressure. Cause of anomaly was voids in seam weld. Revised vendor test procedures to require 100% bubbling during vendor testing (wintec).

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		141FM01	C-N/A	<p>H-EMU-141-D004 (10/13/86) screen to cartridge/frame weld separation resulted in leakage. No corrective action taken.</p> <p>H-EMU-141-D007 (9/27/91) - During bubble point acceptance testing the gas trap emitted the first stream of bubbles at 3.9 inches of H2O, (spec: 8.9 inches minimum) due to a puncture in the cartridge screen. No corrective action was taken.</p> <p>H-EMU-141-D008 (9/18/92) - The Gas trap assembly failed bubble point testing at 8.7 inches H2O (Spec: 8.9 inches H2O min.) due to a damaged area of cartridge I.D. pleated screen material, which occurred during cartridge installation on lower housing threaded spindle. Op sheets revised to provide masking or protective cap over threaded portion of lower housing.</p> <p>H-EMU-141-D009 (1/27/93) - Gas trap assembly failed gas separation testing due to either a damaged o-seal in the test fixture between the inlet and outlet flow areas or a partially clogged gas outlet orifice. No corrective action was taken because the exact cause could not be determined.</p> <p>None for the SV805257 configuration.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Dry LCVG Degas Test. None for EET processing.</p> <p>F. Operational Use - P/Ns SV784943 and SV805257: Crew Response - Pre-EVA: Trouble shoot problem. If no success, consider 3rd EMU if available. EMU is go for SCU. EVA: Diminish intensity of activity. Try too stay away from direct sunlight. If cooling inadequate, terminate EVA. Training - Standard training covers this failure mode. Operational Considerations - Flight rules define loss of EMU for loss of thermal control. RTDS allows ground monitoring of EMU systems. EVA check list procedures verify hardware integrity and systems operational status prior to EVA. Flight rules define EMU as go to remain on SCU (available for rescue if required).</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-141 GAS TRAP
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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